

# Keynotes

January-February 2002

Atlantic Oceanographic and Meteorological Laboratory

Volume 6, Number 1-2

## News from the AMS Meeting

The American Meteorological Society hosted its 82nd annual meeting in Orlando, Florida on January 13-17, 2002. Staff members from AOML's Hurricane Research Division (HRD) and Office of the Director attended the meeting and participated in various technical sessions, as well as special symposia honoring pioneers in the field of meteorology. Here is a summary of their activities:

- Frank Marks, a meteorologist with HRD, made a presentation at a symposium honoring Dr. David Atlas, a pioneer and leader in the field of radar meteorology.

- Robert Burpee, former director of the National Hurricane Center and AOML's Hurricane Research Division, made a presentation at a symposium honoring Dr. Richard Reed for half a century of progress in meteorology.

- Christopher Landsea, a meteorologist with HRD, was the recipient of an Editor's Award for his outstanding contributions to the journal *Weather and Forecasting*. He also presented a paper at the 13th Symposium on Global Climate.

- Howard Friedman was appointed chairperson of the AMS' Board on Women and Minorities. He also co-chaired the K-12 Educational Initiatives Session of the 11th Symposium on Education.

- Erica Van Coverden, outreach coordinator at AOML, and Michael Crane, NESDIS liaison at AOML, staffed NOAA exhibition booths, fielding questions and disseminating information.

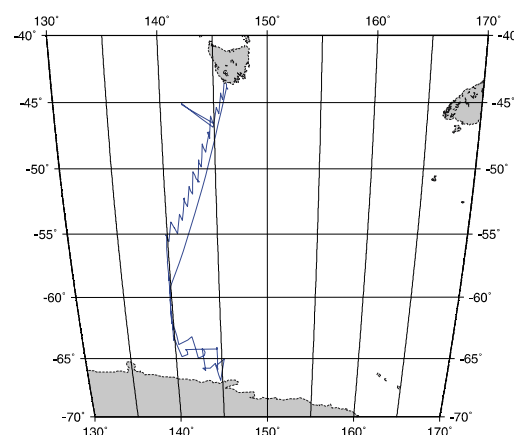
## NOAA/University Scientists Study Methyl Bromide and Methyl Chloride Cycling in the Southern Ocean

*Shari Yvon-Lewis and Kelly Goodwin (AOML/Ocean Chemistry Division), James Butler and Daniel King (NOAA/Climate Monitoring and Diagnostics Laboratory), and Eric Saltzman and Ryszard Tokarczyk (University of California at Irvine)*

As part of a study supported by both NASA and NOAA, scientists from two NOAA laboratories and the University of California at Irvine participated in a research cruise aboard the Australian icebreaker *Aurora Australis*. The ship departed Hobart, Tasmania, Australia on October 28, 2001 and returned on December 13, 2001. The objective of this research effort was to obtain reliable measurements of the uptake of methyl bromide, methyl chloride, and other climatically important halocarbons in the Southern Ocean.

Atmospheric methyl bromide ( $\text{CH}_3\text{Br}$ ), which is of both natural and anthropogenic origin, has been identified as a Class I ozone-depleting substance in the amended and adjusted *Montreal Protocol on Substances that Deplete Stratospheric Ozone*. Methyl chloride ( $\text{CH}_3\text{Cl}$ ) is the most abundant halocarbon in the atmosphere and is a naturally-occurring compound. The role of the ocean in regulating the atmospheric burdens of these gases is still somewhat uncertain. Methyl bromide and methyl chloride are both produced and destroyed in the ocean through chemical and biological processes. Degradation has been shown to occur at rates that are faster than can be explained by known chemical degradation reactions, and evidence suggests that this additional degradation is bacterial consumption of these compounds. The organisms or reactions that can produce  $\text{CH}_3\text{Br}$  and  $\text{CH}_3\text{Cl}$  at rates sufficient to explain observed concentrations are not known. Recent measurements have shown that, on the whole, the ocean is a net sink for  $\text{CH}_3\text{Br}$ , and low latitude regions are a net source of  $\text{CH}_3\text{Cl}$  while the high latitude ocean is a net sink for  $\text{CH}_3\text{Cl}$ . Measurement coverage to date has been limited and sporadic, which restricts our ability to map the spatial and temporal variations that are necessary for understanding how the system will respond to perturbations (e.g., global warming).

The measurements made during this cruise were designed to help improve our understanding of the role that the oceans play in the cycling of  $\text{CH}_3\text{Br}$  (continued on page 2)



Cruise track of the *Aurora Australis*, which departed Hobart, Australia on October 28, 2001 and returned on December 13, 2001.



**Washington's  
Birthday**  
February 18, 2002



AOML is a research laboratory of NOAA's Office of Oceanic and Atmospheric Research located on Virginia Key in Miami, Florida



## AOML Hosts International AMOSSG Meeting

AOML hosted a meeting of the Aerodrome Meteorological Observing Systems Study Group (AMOSSG) of the International Civil Aviation Organization (ICAO) during the week of January 22nd. ICAO, an agency of the United Nations, promulgates standards and recommended practices covering all aspects of international civil aviation, e.g., facilities, services, and procedures affecting aircraft operations, and has international treaty status. The Study Group reviewed requirements for meteorological observations at airports to support international aviation, assessed the current capability of automatic weather observing systems to meet future requirements, and developed guidance materials on automated weather observing systems. In addition to U.S. representatives, ICAO representatives from Australia, Canada, Finland, France, Netherlands, and the United Kingdom participated, as well as representatives from ASECNA (an organization representing French-speaking West African countries), the International Air Transport Association (representing international air carriers), and the World Meteorological Organization.

## Pot Luck Luncheon

*(bring a dish to share with others)*

**March 1, 2002**

**1:00 p.m.**

**AOML Staging Area**

**AOML  
and the  
Southeast  
Fisheries Science  
Center**

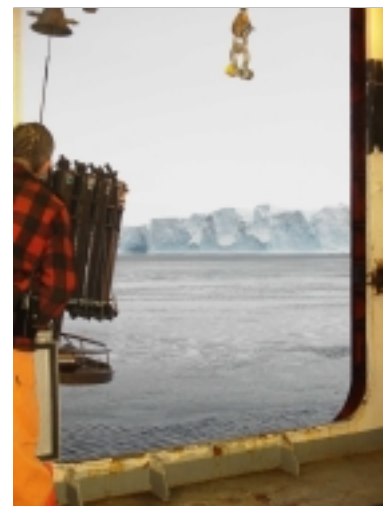
Contact Gladys Medina for more info  
(305-361-4300 or  
Gladys.Medina@noaa.gov)

*(Continued from page 1)*

and  $\text{CH}_3\text{Cl}$ . Measurements were made of the concentrations of  $\text{CH}_3\text{Br}$ ,  $\text{CH}_3\text{Cl}$ , and a suite of natural and anthropogenic halocarbons in the air and surface water, degradation rates of  $\text{CH}_3\text{Br}$  and  $\text{CH}_3\text{Cl}$  in the surface water, and depth profiles of  $\text{CH}_3\text{Br}$ ,  $\text{CH}_3\text{Cl}$ , and other halocarbons.

The combined results from these measurements will be used to constrain the budgets of  $\text{CH}_3\text{Br}$  and  $\text{CH}_3\text{Cl}$  in these waters at this time of year. The relative importance of the biological and chemical processes will be examined for high latitudes. Attempts will also be made to extract relationships between the degradation rates and concentrations measured and satellite measurements in order to develop proxies that can provide global coverage on shorter time scales.

At this time, there is insufficient data to examine seasonal and long-term trends in net flux, production, or degradation. Until satellite measurable proxies can be found, additional research cruises are needed to reduce the uncertainty in the global net flux estimate and to map the spatial and temporal variations in the net fluxes, production rates, and degradation rates of  $\text{CH}_3\text{Br}$ ,  $\text{CH}_3\text{Cl}$ , and other climatically-important halocarbons.



Deployment of a CTD/rosette instrument in Buchanan Bay near the Mertz Glacier Tongue, Antarctica.

## ImmersaDesk Virtual Reality Device Premieres in Miami

*Erica Van Coverden, Office of the Director*

NOAA's High Performance Computing and Communications (HPCC) office has funded a project to experiment with an immersive virtual reality device to explore its possible application in the study of oceanographic and atmospheric sciences. The ImmersaDesk is currently touring the NOAA laboratories as part of a HPCC technology transfer grant. The ImmersaDesk completed its tour at AOML the week of January 22nd and will next be shipped to the National Severe Storms Laboratory in Norman, Oklahoma.

The ImmersaDesk is a drafting table format, projection-based virtual device which uses stereo glasses and sonic head/hand tracking to offer a type of virtual reality. Its larger cousin, the CAVE, is fully immersive, projecting virtual reality on the walls and ceiling surrounding the user. The ImmersaDesk is simply a single-wall CAVE. It can render both model output and in-situ data, producing contour slices, isosurfaces, vector fields, and Lagrangian tracer paths. These surfaces and slices can be moved on the fly by the user to explore the data as the data evolve through time.

Christopher Moore, a research scientist at the Joint Institute for the Study of the Atmosphere/Pacific Marine Environmental Laboratory, is accompanying the instrument, presenting demonstrations and giving local researchers the chance to view their data on the ImmersaDesk. During his introductory presentation, Chris captivated the audience of AOML, National Marine Fisheries Science Center, and University of Miami scientists that packed the room for a glimpse. Chris then gave groups of four or five up-close tutorials for the ImmersaDesk, showing sample imagery and allowing visitors to manipulate and get a feel for the this new way of viewing data. Hurricane Research Division scientists Peter Dodge and John Gamache were even able to have their own data set downloaded and visualized in stereo 3-D. For more information on the ImmersaDesk, please visit <http://www.pmel.noaa.gov/vrml/>.



Scientists don glasses to view data displayed in three-dimensional virtual reality by the ImmersaDesk (Chris Moore is second from right).

## Aerial Study Investigates Groundwater Discharges

Jules Craynock of AOML's Ocean Chemistry Division/Acoustics Research Group conducted an innovative aerial study on portions of Biscayne Bay in January as part of a joint project between the National Ocean Service and AOML to investigate and sample submarine groundwater discharges. Freshwater discharges into Biscayne Bay may be related to area rainfall variations and may be indicators of possible contaminant pathways.



Jules Craynock at the Tamiami Airport in Miami.

Use of the small, lightweight R-22 helicopter for the initial surveys provided a rapid response to a transient event and the ability to GPS-position the scientist close to the water without disturbing the surface, enhancing photo and sampling opportunities. Further experimentation is underway to examine the use of a conductivity-temperature-depth (CTD) instrument and water sampling procedures from the helicopter platform as a cost-efficient tool for coastal environmental sampling. Jules is a veteran Naval aviator with prior experience in aviation applications.

# MS 10K Walk

March 17, 2002

9:00 a.m.

George English Park  
(Ft. Lauderdale)

Walkers, joggers, and  
team sponsors welcome

All proceeds benefit the  
National Multiple Sclerosis Society

Contact

Anne-Marie Wilburn  
(305-361-4336 or

Anne-Marie.Wilburn@noaa.gov)

## Cruise Ship Doubles as Research Vessel

Shailer Cummings and David Palmer, Ocean Chemistry Division

A novel partnership between the commercial, academic, and federal maritime communities is enabling scientists to collect a unique data set from onboard a world-class cruise liner. The *Explorer of the Seas* is a Royal Caribbean Cruise Lines (RCCL) passenger ship equipped with oceanographic and atmospheric laboratories. These laboratories were designed and outfitted by scientists from the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS) and AOML.

Since November 2000, the *Explorer* has served as a platform for gathering oceanographic and meteorological data in the Caribbean Sea, a climatically critical region. Velocity profiles from the weekly repeated cruise track through the Gulf Stream and Windward Passages are being used to address several significant ocean circulation questions.

The *Explorer* continuously measures a suite of biological, chemical, and physical oceanographic parameters. Data are gathered via two acoustic Doppler current profilers (ADCPs), a transmissometer for measuring water transparency, an optical particle counter, dissolved organic material fluorometers, and temperature, salinity, chlorophyll, and dissolved oxygen sensors. A specially designed partial pressure carbon dioxide ( $pCO_2$ ) system (akin to the  $pCO_2$  systems on NOAA vessels) is currently being added to the complement of these autonomous instruments.

A fiber-optic networked data acquisition system logs the NOAA oceanographic data and RSMAS meteorological data with synoptic global positioning system (GPS) positions and GMT time stamps. Examples of these near real-time data can be viewed from the RSMAS web site (<http://www.rsmas.miami.edu/rccl>) by clicking on the "current observations" link and are illustrated in the figure below.

Many *Explorer* passengers attend daily tours of the science facilities and visit the onboard science education/interaction centers known as Eco Learning Centers. The tours are hosted by visiting University of Miami or NOAA scientists. The scientists also present lectures to the passengers which have been very well attended. Passengers depart expressing an interest in continuing to follow oceanographic science. This represents a growing public constituency of environmentally-aware parents, students, educators, and, hopefully, community leaders.

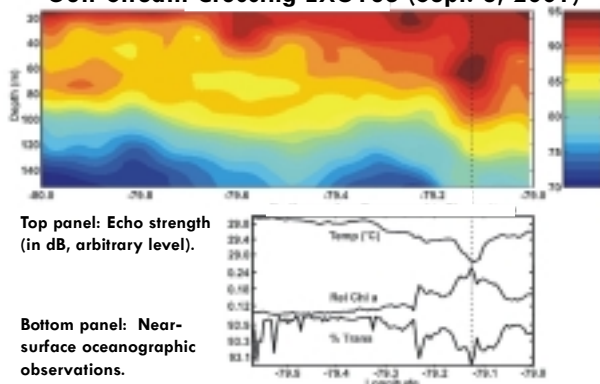


Oceanographic laboratory aboard the *Explorer of the Seas*.

### Example of Echo Strength and Near Surface Physical Measurements.

The vertical distribution of zooplankton and small fish is related to the color display of sound echo received from an acoustic Doppler instrument (ADCP). High values are found in the dark red region (top panel). Significantly, the highest abundances were observed where Gulf Stream current velocities diminish as the water becomes shallow approaching the Bahamas. Hydrographic features such as current fronts typically have a surface expression whose nature and characteristics can help explain phenomena like the frontal aggregations detected by the ADCP. The bottom panel depicts near surface transmittance, chlorophyll-a fluorescence, and temperature measured coincidentally with the ADCP backscatter data. It is clear that the frontal regime where animals congregated was cooler than the surrounding waters. Moreover, elevated chlorophyll fluorescence coupled with markedly diminished transmittance indicates that phytoplankton (the principal food source for the zooplankton) was also more abundant in this frontal region. Whether physical or biological processes are more important in determining the biological distributions observed should become apparent as more data are analyzed over a longer time period.

### Gulf Stream Crossing EXO136 (Sept. 8, 2001)





Here is what some of NOAA's recent "explorers" of the sea had to say about their experience:

"I think this is a perfect opportunity to explain to the public what we do as NOAA scientists. It is also a great example to explain that satellite weather pictures are generated by NOAA and not NASA, as is generally assumed. I also used the opportunity to explain the NOAA mission and goals, as well as how we differ from other research organizations. I was impressed by the interest that people showed in the research we were doing. The number of visitors increased during the week as the word got out. It was very gratifying to participate in the program, and I hope to do it again."

AOML oceanographer *Silvia Garzoli*

"In my experience, the guests were both intrigued and amazed at the quantity and detail of the scientific equipment available to scientists, and it was a real pleasure to lead those interested down the path of discovery. Many of the guests visiting the science labs or attending the lectures would remember me, and they would eagerly greet me anywhere on the ship as, 'Hey, you're the scientist!'"

AOML meteorologist *Sean White*

"I was on board for one of the earlier voyages to help work on our oceanographic systems. The lab tours were very well received and well attended. Informally, as we wandered around the ship, we also held numerous conversations with passengers who were very interested in the project and in NOAA and held high regard for both."

AOML oceanographer *Peter Ortner*

"I truly enjoyed this unique experience. As a research scientist, I am trained to rigorously test scientific hypotheses using the tried and true scientific method. It was nice, however, to briefly step out of that mold and teach basic science to individuals who were genuinely interested in learning more about the atmosphere and ocean. I wholeheartedly recommend this program to other scientists and hope to represent NOAA on the *Explorer of the Seas* in the future."

AOML meteorologist *Joseph Cione*

## NOAA Researchers Exploring the Sea in a New Capacity

*Erica Van Coverden, Office of the Director*

Have you ever been aboard a cruise ship and wondered what was happening in the deep blue ocean below, or the star-studded skies above? Have you ever been on a tropical vacation and made new and fascinating discoveries about the oceans and environments you were traveling through? Or have you simply had an afternoon chat with an oceanographer or meteorologist about the current weather or sea state while on your vacation? If not, you are missing out on one of the newest ways the public has to interact with scientists at sea.

For the past year, several of NOAA's Miami-based research scientists have participated in a new form of community outreach that takes quite a departure from the traditional classroom visit. These scientists are participants in the



*The Explorer of the Seas at port in Labadee, Haiti.*

*Explorer of the Seas* visiting scientist program. The *Explorer of the Seas* is a Royal Caribbean Cruise Lines (RCCL) passenger ship that traverses the Gulf Stream and Windward Passages each week. The University of Miami Rosenstiel School of Marine and Atmospheric Science (RSMAS) and RCCL have installed atmospheric and oceanographic laboratories aboard the ship, the first of its kind.

AOML's contribution includes the design, installation, and monitoring of the autonomous oceanographic instrumentation aboard the *Explorer*. This instrumentation includes two ocean surveyor acoustic Doppler current profilers that monitor ocean currents and biomass such as fish and plankton. Additionally, seawater sensors measure temperature and salinity, chlorophyll and dissolved organic material, and dissolved oxygen.

This overall effort represents an unprecedented partnership between the business, academic, and Federal maritime communities. From a NOAA perspective, it offers the opportunity to collect a unique, long-term data set in a climatically critical region.

Many RCCL passengers take advantage of the opportunity to tour these facilities and visit the onboard science education/interaction centers known as Eco Learning Centers. Although these laboratories help to make *Explorer* a one-of-a-kind cruise ship, the added component of a weekly visiting scientist gives passengers a chance to become ocean explorers as they cruise through the Caribbean and Gulf Stream waters.

In exchange for room and board provided by Royal Caribbean, the visiting scientist works daily on a research project of his or her own design or assists the onboard University of Miami technician with laboratory maintenance. The most exciting component, however, is interaction with the passengers. Visiting scientists present two lectures while on board: one about the actual laboratories and one about their field of expertise. Topics have ranged from the anatomy of a hurricane to career options in oceanography.

The laboratories are also open daily for tours provided by the visiting scientist. Passengers can learn about various instruments used to collect data and why measurements in the Gulf Stream region are so important to scientists. They can also get a first-hand chance to see up-to-the-minute readings on measurements such as ship speed, ocean temperature, rain rate, and dissolved oxygen and carbon dioxide levels.

The interaction does not end with scheduled appearances, however. From casual poolside conversations to lively chats over dinner, there are many opportunities for passengers to interact and learn much from their resident expert. Every scientist that has participated in the *Explorer* program comments on the constant interaction with the crew and passengers.

**February is National African American History Month**

## Welcome Aboard

Sang-Ki Lee joins the staff of the Physical Oceanography Division as a CIMAS research associate to assist Dr. Carlisle Thacker with the task of assimilating expendable bathythermograph (XBT) data into the University of Miami's hybrid-coordinate ocean model (HYCOM). Dr. Lee obtained a doctoral degree from Old Dominion University under the guidance of Prof. Gabriel Csanady. For the past five years he has worked for Samsung Heavy Industries in Korea.

## Congratulations

Sim Abernson, a meteorologist with the Hurricane Research Division, was awarded a doctoral degree in meteorology from the University of Maryland in January 2002 for his dissertation entitled "Targeting observations to improve tropical cyclone forecasts." The work covers operational Gulfstream-IV synoptic surveillance flights during 1997 and 1998, and shows little improvement to the dynamical models used at the National Hurricane Center for track forecasting. However, using information from ensemble forecasting systems, only certain "targeted" data can be assimilated into the models, and improvements of up to 30% are seen. These results currently are being used to plan surveillance missions.

Molly Baringer, an oceanographer with the Physical Oceanography Division, was elected by American Geophysical Union constituency to the position of Secretary of Physical Oceanography for the Ocean Sciences section.

## CPR/AED

(Cardio-Pulmonary Resuscitation/  
Automated External Defibrillator)

## Training Class



**February 1, 2002**

**9:00 a.m. - 1:00 p.m.**

**First-Floor Conference Room**

Contact Joe Pica to register  
(305-361-4544 or  
Joseph.A.Pica@noaa.gov)

**Sponsored by the American Red Cross**

## Innovative Proposal Nets Finalist Position in International Competition

*Shailer Cummings, Ocean Chemistry Division*

Dr. Kelly Goodwin, a microbiologist with AOML's Ocean Chemistry Division, received a finalist commendation plaque applauding her participation in the 2001 Takeda Foundation funding competition. The Takeda Foundation ([www.takeda-foundation.jp](http://www.takeda-foundation.jp)) annually funds several categories of research and entrepreneurship. She and co-principal investigators Dr. Peter Ortner (AOML) and Dr. Jack Fell (University of Miami's Rosenstiel School) competed in the "Novel Technologies for Chemical Measurement used for Environmental Monitoring" category. The proposal was entitled "*Molecular based in-situ, remote sensor for detecting microbial contaminants.*" Ideas in the proposal included using DNA probes that "stick" only to unique zones along the DNA strand in order to identify microbes in environmental samples. The sensor would extract the DNA remotely, and the DNA-specific probe would have a highly fluorescent tail facilitating easy and rapid detection.

In early October 2001, Kelly submitted her proposal electronically, along with a hundred other hopefuls from Japan, Canada, and the United States. This was a unique competition process. It was conducted entirely over the Internet, except for telephone interviews of the five finalists. Several volleys of questions and answers between the authors and the Selection Committee narrowed the field to 16 proposals. During late October and early November 2001, the remaining competitors were encouraged to ask questions of others in the group of 16. This was conducted as a cyber-forum over the Internet. Each participant was evaluated based on both the questions they asked others and the responses they gave to questions received from others about their projects. It got exciting!

Challenges skyrocketed when Dr. Goodwin left for Australia to participate in a seven-week cruise to Antarctica in late October 2001. Kelly met the cyber challenge and continued to stay on top of the questions via email and with her ground support crew consisting of husband Rob Johnson and AOML allies. By the end of the second week in November, Kelly advanced to the final round and was selected as one of five finalists. The most challenging event came as Kelly gave a satellite-linked PowerPoint presentation and answered questions for the Final Selection Committee located in Japan while she was at 60°S on the R/V *Aurora Australis*. Although Kelly was not the final award recipient, she showed us all what is possible using today's technology, and we are very proud of her.



## Miami Librarian Presides over International Conference

Linda Pikula, NOAA Miami Regional Librarian, completed her second year as President of the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC), an international association of 400 marine science library professionals. Representatives from 48 countries attended the 27th annual IAMSLIC Conference "Managing Resources in a Sea of Change" hosted by the Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER) in Brest, France on October 14-18, 2001. Through a partnership with the Intergovernmental Oceanographic Commission, conference grants enabled 20 participants from Africa and Eastern bloc countries to attend.



South African delegates at the international IAMSLIC Conference in Brest, France. Linda Pikula appears in the back row, third from the right.



## Travel

Kristina Katsaros attended a Senior Research Council Meeting in Washington, D.C., on January 8-10, 2002.

Hugh Willoughby attended Operation Sierra Storm 2002 at Lake Tahoe on January 9-10, 2002 and made a presentation entitled "21st century hurricane disasters."

James Hendee attended the Atlantic/Caribbean Coral Reef Monitoring and Mapping meeting in St. Thomas, U.S. Virgin Islands on January 15, 2002 and made a presentation about the coral reef early warning system (CREWS).

Peter Black, Peter Dodge, Howard Friedman, Kristina Katsaros, Christopher Landsea, Frank Marks, Shirley Murillo, Robert Rogers, and Erica Van Coverden attended the 82nd Annual Meeting of the American Meteorological Society in Orlando, Florida on January 13-17, 2002.

James Farrington participated in a high-density expendable bathythermograph (XBT) transect between Cape Town, South Africa and the United States in January aboard the M/V *Maersk California*. James deployed approximately 150 XBTs and six drifters as part of the NOAA/Office of Global Programs funded AX08 XBT line to investigate mesoscale dynamics in the tropical Atlantic Ocean.

Jack Stamates will participate in the National Marine Fisheries Service's Winter Marine Mammal Survey 2002 aboard NOAA's R/V *Gordon Gunter* on February 4-25, 2002.

Silvia Garzoli, Tsung-Hung Peng, Rik Wanninkhof, Brian Ward, and Jia-Zhong Zhang will attend the 2002 Ocean Sciences Meeting of the American Geophysical Union in Honolulu, Hawaii on February 11-15, 2002.

Douglas Anderson, Robert Molinari, Claudia Schmid, and Derrick Snowden will participate in a research cruise aboard the NOAA ship *Ronald H. Brown* in February 2002 to study the interaction between the tropical and subtropical Atlantic and the possible role of these interactions on global climate.

## Thank You!

Seven families in the South Florida community received Winn Dixie gift certificates this past holiday season due to the generosity of AOML staff members. The holiday-giving campaign was organized by Evan Forde, an oceanographer with the Office of the Director.

Several of the gift certificates went to the families of students from Flamingo Elementary School in Hialeah, Florida. Said Assistant Principal Ileana Sotolongo in a letter of thanks, "I wish you could have seen the excitement and appreciation of those families as they received the gifts. Most community outreach during the holidays overwhelmingly target underprivileged children with toys but few provide families the opportunity to gather together around a table and enjoy the more basic of life's needs and joys. Because of your generous contributions, we were able to make some families very, very happy this Christmas."

Thanks to all who contributed to the holiday-giving campaign. Your generosity made a wonderful difference in the lives of others.

## Happy Holidays 2001



View Keynotes online: <http://www.aoml.noaa.gov/keynotes>

*Keynotes* is published bi-monthly by the Atlantic Oceanographic and Meteorological Laboratory. Contributions and/or comments are welcome and may be submitted via email (Gail.Derr@noaa.gov), fax (305) 361-4449, or mailing address: NOAA/AOML, *Keynotes*, 4301 Rickenbacker Causeway, Miami, FL 33149.

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